

COCKPIT ARRANGEMENT AND CONTROLS

The location of the various controls are shown on the photographs of the cockpit, on pages 6 to 9, inclusive, and include the following:

In addition to the regulation stick control for ailerons and elevators and rudder pedals for the rudder, the N3N-3 is provided with the following controls:

FRONT COCKPITREAR COCKPITFLYING CONTROLS

Elevator Tab

Elevator Tab

POWER PLANT CONTROLS

Throttle &amp; Mixture

Throttle &amp; Mixture

Spark

Spark

Carburetor Air Heater

-

Hand Fuel Wobble Pump

Hand Fuel Wobble Pump

Fuel Shut-Off Cock

Fuel Shut-Off Cock

Ignition Switch

Ignition Switch

Primer Pump

-

Fuel Gauge Pump

Fuel Gauge Pump

CO<sub>2</sub> Fire ExtinguisherCO<sub>2</sub> Fire Extinguisher

Pull

Pull

AUXILIARY CONTROLS

Rudder Pedal Adjustment

Rudder Pedal Adjustment

Tail Wheel Lock

Tail Wheel Lock

Electrical Rheostat for

Electrical Rheostat for

Controlling Instrument

Controlling Instrument

Board Lights

Board Lights

Light Switches

Light Switches

Seat Adjustment

Seat Adjustment

Aileron and Elevator

-

Parking Lock

FLYING CONTROLSELEVATOR TAB

The left hand elevator is provided with a trailing edge tab, controllable from either cockpit by means of cable, operated by hand levers. The tab provides the necessary longitudinal balance for various loaded conditions. The hand lever in either cockpit is vertical when the tab is in neutral position. The tab can be adjusted to 15° above or below its neutral position, and can be locked (from the rear cockpit only) in any position, by a thumb screw provided on the large shieve, just to the left of the pilot seat. When the hand lever is moved forward, the nose of the airplane goes down. It is suggested that a neutral setting should be used for the first take-off, unless the proper setting has already been determined. Experience will indicate the best setting for the particular load condition.

AILERON TAB

Both the upper ailerons are provided with small metal trailing edge trimming tabs. These tabs are adjustable on the ground only, for correcting any slight difference in the lateral balance.

RUDDER TAB

The rudder is provided with a small metal tab similar to the aileron tabs. This tab is adjustable on the ground only, for correcting any slight differences in the directional trim of the airplane.

POWER PLANT CONTROLS OPERATIONTHROTTLE AND MIXTURE CONTROLS

The throttle and mixture control handles are assembled in a single engine control unit located on the left side of each cockpit and are interconnected by means of jackshafts and steel tubes with ball bearing rod ends. The rear unit is provided with a ratchet lock on the mixture control in the front cockpit. In order to operate the mixture control from the front cockpit, it is necessary to tape the lock on the control unit in the rear cockpit in the unlocked position. The operation of controls is as follows:

<u>CONTROL</u>	<u>FORWARD</u>	<u>REARWARD</u>
Throttle	Open	Closed
Mixture	Rich	Lean

SPARK CONTROL

The spark is remotely controlled from either cockpit. The control handle is located on the left side, just below the longeron. The spark should be in the advanced position (forward) except when starting engine, engine stopping, or taxiing as a seaplane.

CARBURETOR AIR PREHEATER CONTROL

A valve in the air box below the carburetor permits taking heated air from the exhaust manifold shroud into the carburetor. The control is located on the left side of the front instrument board, and is pulled out to obtain higher air temperature in the carburetor. The control can be locked in any position by turning the handle clockwise. The use of a carburetor preheater is necessary to prevent or remove the ice formation in the carburetor and around the throttle valve.

The formation of ice in the carburetor can generally be detected (at cruising throttle opening) by a gradual decrease in the speed or irregular operation of the engine. It is important, in order to obtain maximum power, that the carburetor air preheater control be set for cold air before take-off (except in unusually cold or damp weather).

Refer to Technical Order No. 19-38 or latest revision.

#### HAND FUEL WOBBLE PUMP CONTROL

The wobble pump control handle is located on the left side of each cockpit. The wobble pump is located on the left side of the fuselage just forward of the firewall. This pump is used for starting and emergency operations, since fuel is normally delivered to the carburetor by an engine driven fuel pump.

#### FUEL SHUT-OFF COCK CONTROL

The controls are located on the left side of the fuselage. The nameplate at each handle clearly indicates the "OFF" positions. The fuel shut-off cock is located on the lower longeron (left side) just aft of the firewall, and can be operated from either cockpit.

#### IGNITION SWITCH CONTROL

The ignition switch control handle is located in the left hand corner of either instrument board. The handles are attached to a torque tube which is connected to the ignition switch. This switch is located on the engine mount upper left side just forward of the firewall.

FUEL GAUGE AND PUMP

The fuel tank is provided with a hydrostatic type fuel gauge. A gauge and pump are provided on the right side of either instrument board. The gauge reads correctly in level flight. See correction chart (located on left side of fuselage, just below instrument board) for other attitudes. The correction chart reads directly in gallons.

FIRE EXTINGUISHER SYSTEM (PRESSURE)

The airplane is provided with a CO<sub>2</sub> fire extinguisher system, with release pull handles located on the right hand side of either cockpit. The outlets of this system are so located that when the container valve is released the engine, carburetor and engine compartment are completely flooded with carbon dioxide.

HAND FIRE EXTINGUISHER

A hand fire extinguisher is also mounted on the right hand side of the fuselage, in the rear cockpit. Refer to Technical Order 11-37.

STARTER CONTROL

The starter control is located near starter extension sleeve on outside of engine cowl. See Note under Starting.

## AUXILIARY CONTROLS

### RUDDER PEDAL ADJUSTMENT

The rudder pedals may be adjusted to suit the pilot. The adjustment latches are located at the outboard side of each rudder pedal, and are operated by the foot. The adjusting mechanism is arranged so that the pedals will automatically move toward the seat when the lock is released. Greater distance from the seat may be obtained by releasing lock and pushing pedals forward.

### TAIL WHEEL LOCK

The tail wheel is provided with a lock, controllable from either cockpit. The wheel is unlocked when the handle is in the forward position. To lock control raise handle to vertical position.

When the wheel is in the unlocked position the tail wheel is free to swivel 360°. The tail wheel is provided with a centering device, to make the wheel trail aft when off the ground. With the wheel in the locked position the wheel will automatically lock when it trails in the line of flight.

It is recommended that the tail wheel be locked just before take-off and unlocked just before making a turn on the ground after landing.

### RHEOSTATS

Rheostats control the intensity of the instrument lights and are provided on each board in addition to the instrument light switches. The rheostat is located on the right hand side of either instrument board.

LIGHT AND RECEPTACLE SWITCHES

In the right hand corner of either instrument board individual switches are provided for the instrument board lights, navigating lights and receptacle. The receptacle is provided for use with a Type D-1A extension cable.

SEAT ADJUSTMENT

The pilot's seat may be adjusted for better visibility in landing. The locking lever is located on the right hand side of the seat. The latch is unlocked by pulling lever aft and will automatically lock when lever is released.

AILERON AND ELEVATOR PARKING LOCK

A strap type lock is provided with each airplane for locking the ailerons and elevators in a neutral position for parking. Attachments are provided in the front cockpit only for attaching lock.

POWER PLANT

GENERAL DATA

Engine: Wright Model R760-2 or R760-8  
manufactured by the Naval  
Aircraft Factory.  
Engine Ratio: 1:1  
Supercharger: None  
Characteristics: See power curve on page 22  
Propeller: Hub Design Bu.Aero.5406 A  
(L or R)  
Blade Design (2) Bu.Aero.4350F  
9'0" dia.

ENGINE RATING

Take-Off 235 B.H.P. at 2000 r.p.m.  
Normal 235 B.H.P. at 2000 r.p.m. at  
sea level

ENGINE OPERATION

STARTING

1. Pull propeller through several turns to make certain that combustion chambers are free of excess oil.
2. Fuel "ON"
3. Mixture Control - Full "Rich" position
4. Throttle Setting - Approx. 1/2 inch open
5. Spark Control - Approx. "Full Advance" but if engine shows a tendency to "kick" back, it may be necessary to retard the spark about half-way. This procedure is advisable in cold weather.



6. Hand Fuel Wobble Pump - 20 strokes, 3 to 5 lbs. on fuel pressure gauge.
7. Primer - 6 to 8 strokes for cold weather starting. 3 to 5 strokes for warm weather starting.
8. Starter - Insert crank and bring starter up to speed.
9. Ignition Switch - Turn to "Both" position.
10. Engage Starter - Pull starter release control handle.
11. CAUTION - Do not pump throttle to start engine or keep it running. As soon as engine fires open throttle slowly until tachometer registers about 700 r.p.m. and advance spark to "Full Advance".

NOTE: The starter crank extension is located on right hand side and rotates counter clockwise on first 50 airplanes. The starter cranking on these planes will be changed to left side by Bureau Change. All other airplanes will have starter cranking on left side in counter-clockwise rotation. Stowage for starter crank is provided in the engine compartment. Access doors are provided in engine cowl on both sides of all airplanes.

WARMING UP

1. When engine starts, oil gauge should be watched for pressure. If pressure gauge does not indicate pressure within one-half minute, engine should be shut down and an investigation made.
2. After gauge indicates pressure, run engine 600-800 r.p.m. until pressure is normal for this speed (50 to 80 lbs./sq.in.). Increase r.p.m. to 1000 after at least 5 minutes warm-up.
3. Minimum "oil-in" temperature for normal take-off, using Symbol 1100 oil - 25°C, using Symbol 1120 oil - 30°C. Reference Technical Order 35-38.
4. Check loss of r.p.m. when engine is switched to running on one magneto at a time. Speed should not drop more than 75 r.p.m. below reading when operating on both magnetos.

TAKE-OFF

Set mixture control full rich. Maximum allowable r.p.m. 2000.

CLIMB

After take-off, use throttle as necessary for desired operation. Maximum allowable r.p.m. 2000. Mixture full rich (see paragraph on Mixture Control below).

HIGH SPEED LEVEL FLIGHT

Set mixture control full rich (see paragraph on Mixture Control below): maximum allowable r.p.m. 2000.

CRUISING

It is recommended that all cruising operations be conducted in a range not to exceed 1800 r.p.m.

LANDING

Set mixture control in full rich position.

STOPPING ENGINE

1. Close throttle
2. Mixture control to lean
3. Idle for about one (1) minute
4. Slowly advance throttle to 700-800 r.p.m.
5. Cut switch when engine stops firing.

MIXTURE CONTROL

During take-off, climb at or near maximum rate and high speed level flight below 4000 feet altitude, the mixture control shall be maintained in the full rich position. For all operations above 4000 feet altitude at or near full throttle, the mixture may be leaned only sufficiently to maintain smooth engine operation. For cruising operations at or below 1800 r.p.m., where low specific fuel consumption is of major importance, the mixture may be leaned sufficiently to give a drop of 20 r.p.m. in engine speed. If throttle setting or altitude is changed appreciably during flight, the mixture control must be reset. Before descending from altitude at which mixture control was set, reset control to "Full Rich".

FUEL

73 Octane: AN-9527 ✓  
Consumption.- See page 22.

OIL

Temperature.- In accordance with current Bureau of Aeronautics Technical Orders.

Pressure.- Rated and cruising speed, range  
65-85 lbs. per sq. in.

OVERSPEED

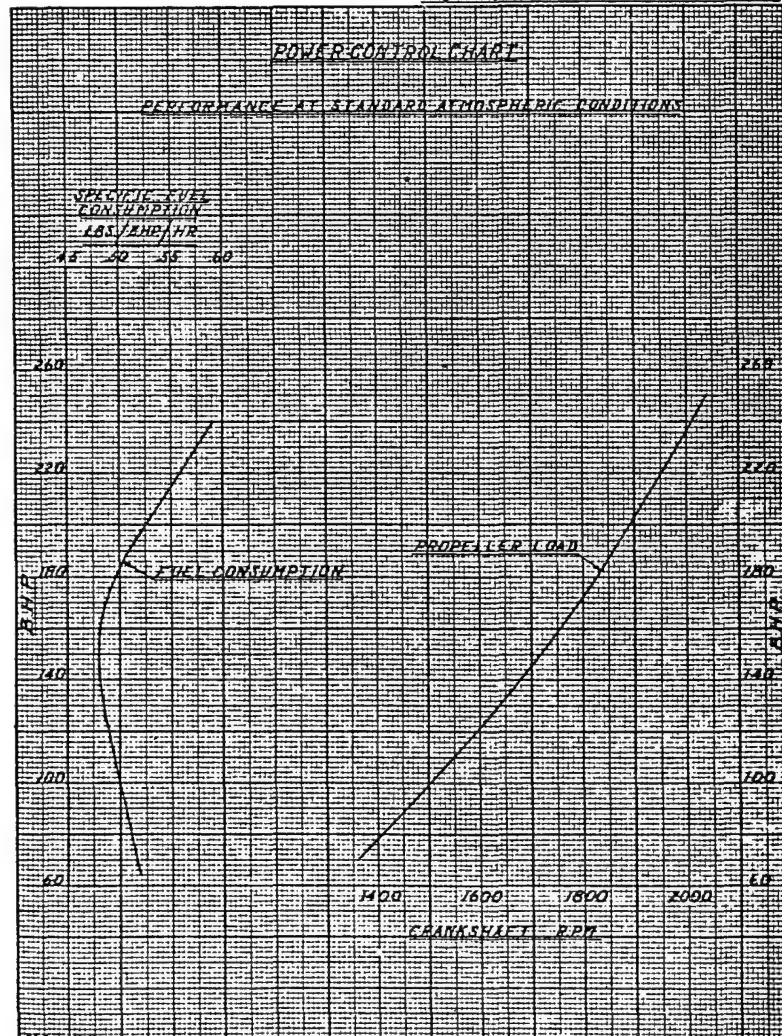
Maximum allowable 2400 r.p.m. during dives.

FUEL SYSTEM

The fuel system has one tank of 45 gal. capacity (located in the fuselage just forward of the front pilot) and is sufficient for about 3-1/4 hours flight at cruising speed of 1800 r.p.m. The normal fuel pressure in flight should be between 3 and 5 lbs. per sq. in. The system can be drained through the strainer in the hand pump unit in which a drain cock is provided.

OIL SYSTEM

The oil tank (located just forward of the firewall) has a capacity of 3.75 gallons not including a foam space of approx. 1.0 gallon and a sump space of .25 gal. A standpipe is incorporated in the bottom of the oil tank which prevents taking oil below the level of its top, thus forming the sump space for collection of dirt and sludge which is drained separately from the oil system. The oil system including the oil in the engine may be drained by operating the drain valve provided below the tank. There is an external oil strainer in "oil out" line. Normal oil pressure - 65-85 lbs. per sq. in. Minimum permissible pressure 50 lbs. per sq. in.



NORMAL INSTRUMENT READINGS

The following normal instrument readings were obtained under (cruising) (89 Kn) 102 M.P.H.

Indicated Airspeed..... 87 Kn  
 R.P.M. of Engine..... 1700  
 Oil Pressure..... 65-70  
 Oil Temperature..... 30-65°C  
 Fuel Pressure..... 3 to 4 lbs./sq.in.  
 Fuel Consumption..... 12 gal.per hr.

ELECTRICAL SYSTEM

When the airplane is to be used for night flying, a Navy Type S34 battery should be installed. The battery support is located on the right side in the engine compartment. Switches for navigation, anchor and instrument board lights, and receptacle are provided on either instrument board. The fuse box (with spare fuses) is located on the right hand side, in the front cockpit.

USEFUL LOAD CARRIED

Crew (2) and Parachutes..... 400 lbs.  
 Gasoline (45 gallons) max. .... 270 lbs.  
 Oil (3.75 gallons) max. .... 28 lbs.  
 Navigating Charts..... 1 lb.  
 First Aid Kit ..... 3 lbs.

The first aid kit is located in the cockpit cowl, on the right hand side just forward of the rear cockpit. A quick detachable door is provided.

MAP CASE

A map case is provided on the right hand side of either cockpit.

FLYING CHARACTERISTICSBALANCE

The N3N-3 airplane may be flown from the rear cockpit with no additional ballast. When using the front cockpit only, a ballast of 125 lbs. should be securely fastened on the rear pilot seat. The variation in the longitudinal balance can be compensated by adjusting the elevator tab to suit.

The baggage compartment, located just aft of the rear cockpit, is strong enough to carry a 20 lb. load for normal flying. When the plane is to be flown at high accelerations or in violent maneuvers, no baggage should be carried in baggage compartment.

See page 27 or 28 for Center of Gravity limits.

TAKE-OFF

The take-off characteristics of the airplane are quite normal and satisfactory. The check-off list given below may be of assistance.

1. Fuel Cock "ON" <sup>"UP"</sup>
2. Set Mixture "RICH" (Forward)
3. See that there is no interference with the flying controls in either cockpit.
4. Check Ballast
5. Set Elevator Tab
6. Set Carburetor Air Heat Control to "COLD" (handle pushed in).
7. Parachute fastened
8. Belt on
9. Warm up the engine to the correct temperature.
10. When in position for Take-Off lock the Tail Wheel.

MANEUVERS

The N3N-3 airplane has been demonstrated to perform satisfactorily the normal flying and maneuver tests for training airplanes as specified by Navy Dept. Spec. SR-38B-3 dated 9/29/38. The normal flying tests include take-offs, landings, horizontal flight in normal altitude, turns, spirals, inclined flight at speeds not greater than 10% in excess of the normal maximum speed in horizontal flight, and side slips in an approach for a landing.

The following maneuvers are satisfactorily performed:

1. Vertical Bank
2. Loop
3. Aileron Roll
4. Snap Roll
5. Immelman Turn
6. Normal Stall
7. Inverted Stall
8. Normal Spin (10 turns to right or left with recovery in one turn)

The airplane has been demonstrated in accordance with the V-g diagram, page 29, in dives and pull-outs up to 174 K.P.H. and 7 g.

NOTE: For restrictions on maneuvering, diving, pull-outs of dives, etc., refer to appropriate Technical Orders.

Revised: 7/31/40



### RECOVERY FROM INVOLUNTARY SPIN

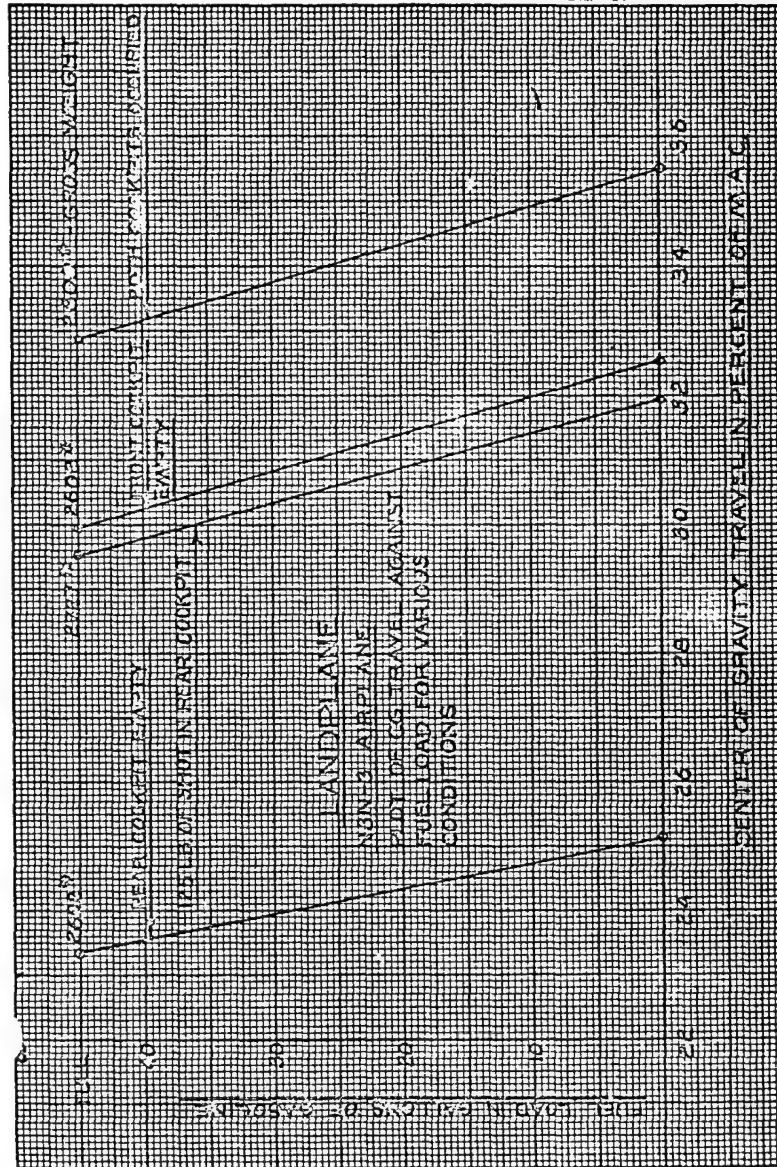
For most rapid recovery from a spin, the following sequence of operations should be followed: (1) apply full opposite rudder, then after 1/4 turn, (2) push stick forward.

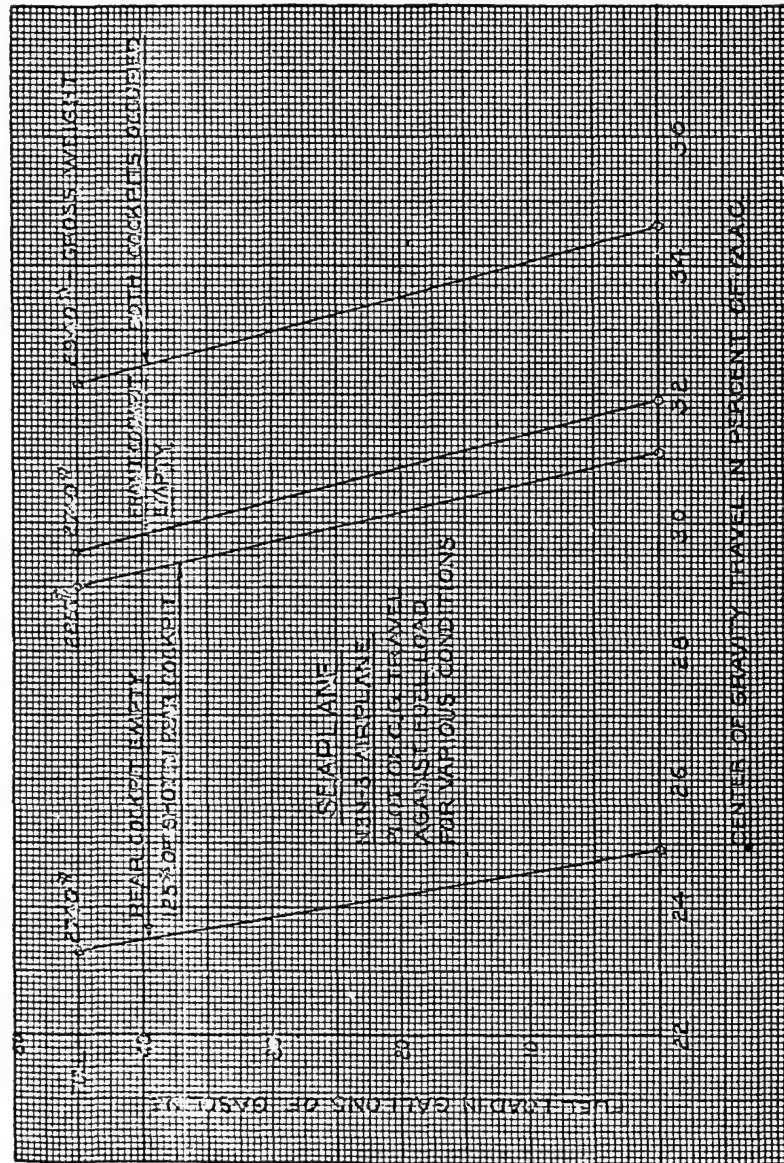
Recovery may also be effected by a simultaneous or reverse order of these operations, but the time or number of turns required to recover from the spin is greater than in the former case. During recovery the controls should be kept in the extreme righting position since slacking-up results in slower, but still positive recoveries.

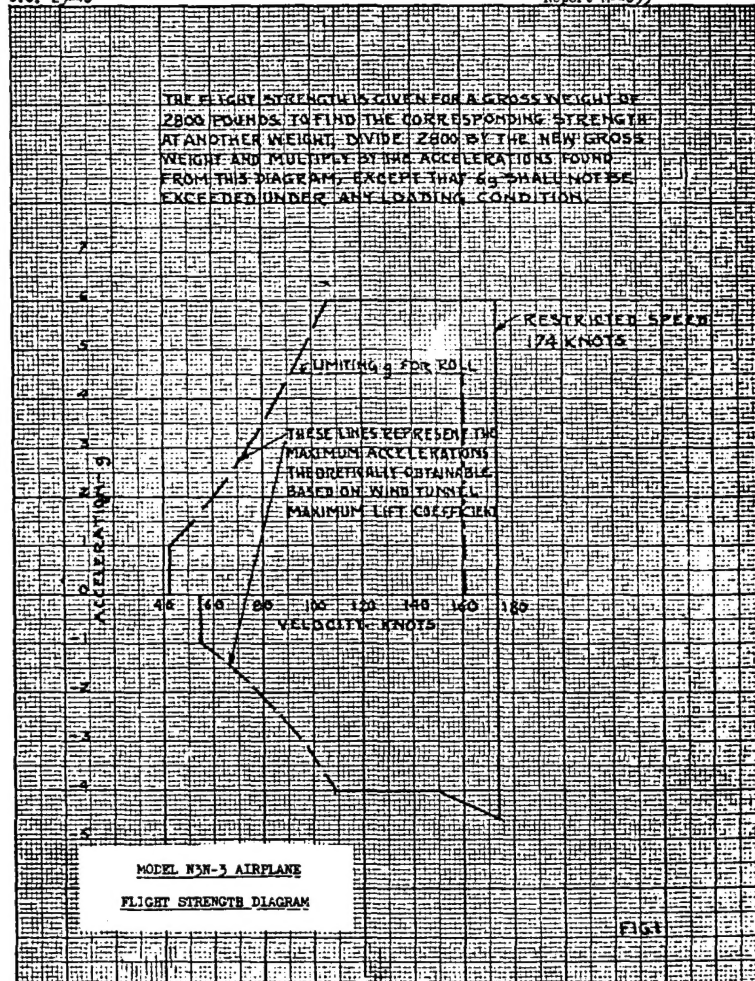
### LANDING

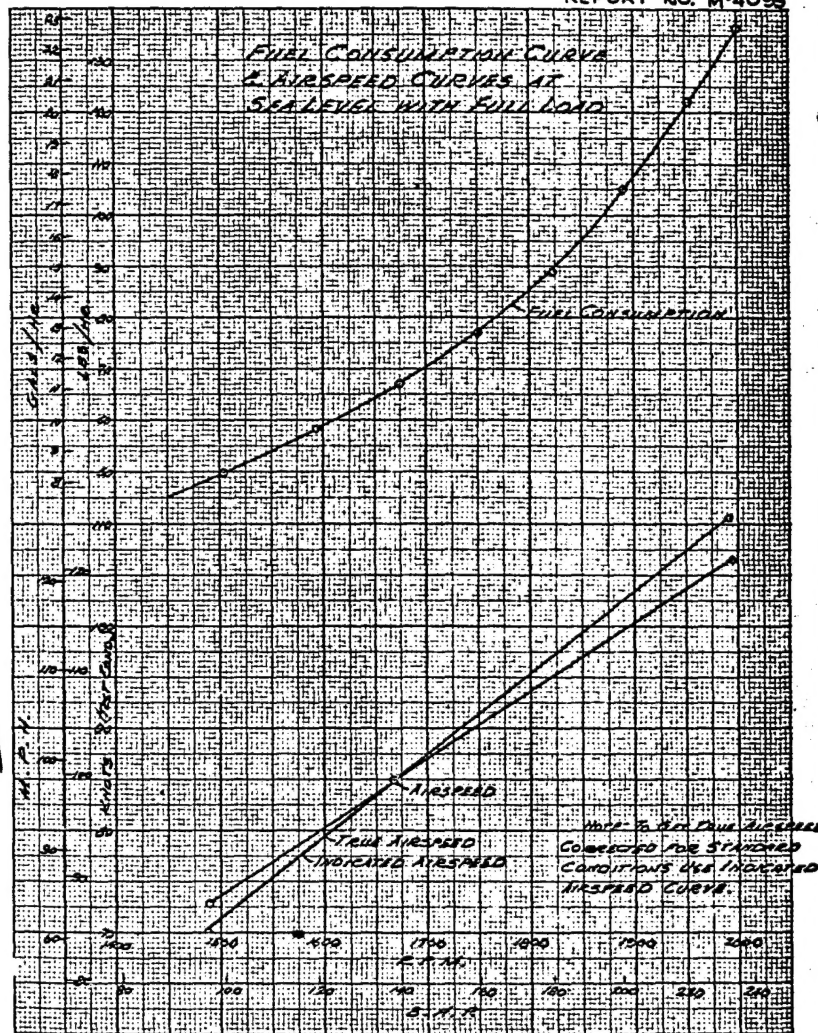
1. The full load stalling speed is (43.5 Kn) 50 M.P.H. (see page 31).
2. Lock Tail Wheel
3. Set Elevator Tab
4. Set Mixture "RICH" (forward)
5. Fuel Cock "ON"
6. Close carburetor heater (push)

NOTE: After landing and before making first turn, unlock tail wheel.









# LANDING SPEEDS & TAKE-OFF DISTANCES

(Sea Level Up to 8000 Feet)

ALTITUDE	TAKE-OFF	TAKE-OFF	TAKE-OFF	LANDING
Feet	Feet	Feet	Feet	M.P.H. : Kn
Sea Level	300	201	120	50.0 : 43.5
2000	370	252	152	51.5 : 44.7
4000	440	304	185	53.0 : 46.1
6000	540	378	232	54.7 : 47.5
8000	650	455	286	56.4 : 49.0

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